CDM

Greater New Haven Water Pollution Control Authority (GNHWPCA), New Haven CT

Capacity, Management Operations and Maintenance (CMOM) Assessment

Draft

June 2008

GNHWPCA
345 East Shore Parkway
New Haven, CT

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Section 1
Overview and Purpose

1.1 Introduction

The Greater New Haven Water Pollution Control Authority (GNHWPCA) the "Authority" owns, operates, and maintains an extensive wastewater collection system. The Authority is expending a significant amount of effort and resources to make improvements in managing its wastewater collection system, and to meet the challenges of an aging wastewater collection system.

The Authority was created in August 2005 and is organized in accordance with Connecticut General Statutes (CGS) Sections 22a-500 through 22a-519. The purpose of the Authority is to further the environmental protection laws of the State of Connecticut and to gain efficiencies and economies of scale with respect to the planning, design, construction, management, operation and maintenance of the Regional Wastewater System. The Authority provides retail sewage collection and treatment service to customers in the City of New Haven and Towns of Hamden, East Haven and Woodbridge (Member Municipalities) and wholesale treatment service to the towns of North Haven and North Branford via interlocal agreements.

For the purpose of this report, CDM is using the proposed Capacity, Management, Operation, and Maintenance (CMOM) rule, which has been developed by the U.S. Environmental Protection Agency (EPA) as a guide to address sanitary sewer overflows (SSOs) from municipal wastewater collection systems. While the Authority is not required to follow the proposed rule, the Authority has initiated a CMOM program for the primary purpose to minimize SSOs. The purpose of the Authority's CMOM Program is to properly manage, operate, and maintain its sewer system to meet the goals set forth in the proposed regulations. The purpose of the assessment is twofold: (1) to assess the Authority's performance relative to the CMOM requirements and (2) to identify business practices that will enable the Authority to improve its performance.

The following is an overview of the four-part draft regulation:

1.1.1 Municipal Satellite Collection System

This section of the draft regulation requires owners of municipal satellite collection systems to:

- Obtain a no discharge National Pollutant Discharge Elimination System (NPDES) permit.
- Obtain a permit amendment with the owner of the Publicly Owned Treatment Works (POTW) facility that receives wastewater from the satellite collection system. (For many municipalities, this will be a new permit with all the enforcement powers of the NPDES regulations.)

1.1.2 Municipal Sanitary Sewer System CMOM Program

This is the heart of the proposed regulations. The GNHWPCA as well as all NPDES permittees (including Satellite Collection Systems) will be required to develop and implement a comprehensive CMOM program following the standards prescribed in the proposed regulation. The key elements of a sound CMOM program include:

- Assessment to ensure adequate capacity during both dry and wet weather
- Effective overall system management, including mapping, maintenance tracking, training, and supervision
- Efficient operations, as measured in spending, equipment performance, and efficiency
- Regular system maintenance

1.1.3 Municipal Sanitary Sewer Systems - General Prohibitions

This portion of the proposed regulation defines the general prohibition of SSO discharges and the use of enforcement discretion for SSOs caused by "severe natural conditions" and affirmative defenses for discharges caused by other factors beyond the "reasonable control" of the utility.

1.1.4 Municipal Sanitary Sewer Systems - Reporting, Public Notification, and Recording

This portion of the rule defines what is considered an SSO and defines procedures for agency notification, public reporting, and recordkeeping. These procedures include immediate notifications and follow-up reports, discharge monitoring reports, and annual reports. The current definition of an SSO as outlined in the proposed regulations is as follows:

> *"A sanitary sewer overflow (SSO) is an overflow, spill, release, or diversion of wastewater from a sanitary sewer system. SSOs do not include combined sewer overflow (CSOs) or other discharges from the combined portions of a combined sewer system. SSOs include:*
>
> - *Overflows or releases of wastewater that reach waters of the United States;*
> - *Overflows or releases of wastewater that do not reach waters of the United States; and*
> - *Wastewater backups into buildings that are caused by blockages or flow conditions in a sanitary sewer other than a building lateral. Wastewater backups into buildings caused by a blockage or other malfunction of a building lateral that is privately owned is not an SSO."*

This assessment provides the Authority an understanding of whether or not the current CMOM program will achieve these goals by determining if the program adequately addresses each element.

1.2 Assessment Process

The Authority retained Camp Dresser & McKee Inc. (CDM) to facilitate the development of its CMOM program. The first phase of the process was to prepare an initial assessment using the EPA Region 4 assessment checklist that follows the proposed regulations. This allowed CDM to gain an understanding of the Authority's overall program, and to specifically assess its wastewater collection system's program as it meets the proposed regulations. During this phase, the following steps were taken.

- Documents were collected and reviewed
- Staff interviews were conducted
- Validation of findings were presented to staff involved in interviews

1.2.1 Records Review

Strategic documents, standard procedures, and representative sample of records, reports, service requests, and work orders were reviewed. Documents that pertained to collection system inspections, operations, and maintenance were evaluated to the degree to which they describe and document the current practices in relation to the consistency with proposed regulations. This records review process provided an understanding of the Authority's policies and procedures.

1.2.2 Staff Interviews

Staff interviews were conducted with individuals or small groups to develop a general understanding of the management philosophy and the current strategic goals for customer service, regulatory compliance, and asset management. Staff primarily represented management personnel responsible for the development and the implementation of the CMOM program. The interviews were conducted to assess the current state of management, operations and maintenance (O&M), and capacity management programs; the use of Information Management Systems (IMS); and interdepartmental coordination and communications.

1.3 Program Deficiencies and Implementation

CDM and the Authority identified deficiencies during the interview phase based on its current business practices regarding consistency with proposed CMOM regulations. Overall, the Authority is meeting the proposed regulation's major requirements and any deficiency is discussed in the following sections.

Section 2
General Information

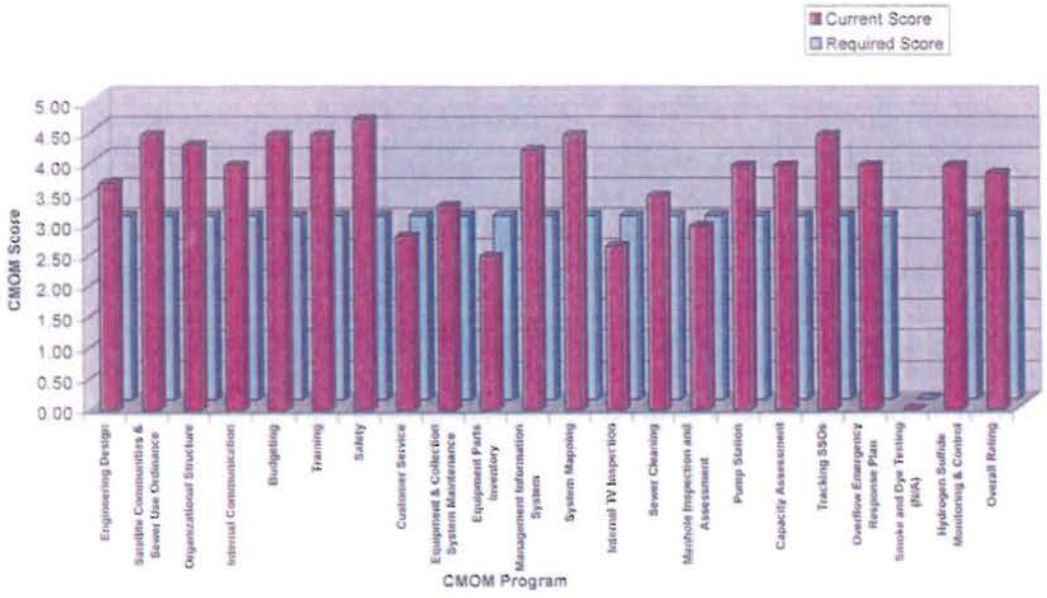
The CMOM Program Self Assessment consists of 21 best accepted practices. Each business practice has a set of questions that were answered by Authority Staff. In order to prioritize the findings and to help prioritize the work, a score was given for each one of the 21 practices.

The score is an average for the wastewater business process, the recognized practice, and the findings from the assessment. The scoring scale from 1 to 5, with five being the highest possible score for a practice, is referenced in Table 2-1. The score summary is referenced in Figure 2-1.

Table 2-1 Scoring Scale

Rating	Description
1.0	Not performing any of the practice – Unaware of the wastewater practice (not in compliance).
2.0	Minimal understanding of the practice – Aware of the practice but program is not being implemented by the agency (not in compliance).
3.0	An understanding of the wastewater practice, program has been implemented but needs additional improvement actions.
4.0	Agency understands the wastewater practice and has implemented the program.
5.0	Fully understand the wastewater practice, program is fully implemented and measured by agency.

Figure 2-1 Authority Scoring Summary



2.1 Engineering Design (ED)

CMOM requires the use of design standards and project inspections during and after a capital improvement project is being executed by Authority staff, contractors, and developers. It also requires the inspection of sewer lines prior to acceptance by the Authority. The intent of the CMOM regulation is to have qualified construction inspectors that are performing the site inspection to ensure the construction is in accordance with the agreed upon plans and specifications.

Typically, sewer design standards are used in the preliminary stages of the project. During this process it is important to seek input from maintenance managers, supervisors, and engineers during the development of design. Key items reviewed by staff during the development of a wastewater collection and/or transmission system project include:

- Line locations, grade, and depth
- Route geography
- Manhole spacing and size
- Influences of pumping stations
- System instrumentation and controls
- Sewer and manhole accessibility
- Knowledge of system flow characteristics
- Initial sewer flow rates compared to design flow rate
- Ability to maintain the improvement

The Authority's Engineering staff has developed design standards and procedures that are followed by contractors and Authority personnel (Appendix A- Manual for Engineers, Developers and Contractors Engaged in the Design, Construction and Permitting of Sanitary Sewers within the GNHWPCA Wastewater System). The "Manual" has the following five sections describing permit procedures and Engineering Design Standards:

Section 1	Introduction and General Information
Section 2	Procedures and Requirements
Section 3	Lateral Design
Section 4	Gravity Sanitary Sewer Design
Section 5	Sanitary Sewer Manholes

The Authority requires permits to construct, repair, modify, connect, or abandon any lateral, or sanitary sewer facility within the Authority's Wastewater System. The Authority has developed a "GNHWPCA Plan Review Process Guideline Flowchart" located in section 2 of the Manual, showing the Authority's plan review process required to obtain sanitary sewer permits. Lateral and Gravity Design Standards are required for all new construction, repairs and/or rehabilitation of sanitary sewer laterals in service areas.

During and after the completion of a sewer lateral and pipeline work, the Authority requires the inspection of the project. Wastewater mainlines are televised and reviewed prior to acceptance by the Authority. This activity is completed by the contractor completing the work and reviewed by Authority staff for both new development and capital improvement projects (warranty inspections). Construction projects are inspected by qualified personnel, professional engineers, and engineering inspectors. The Authority does not install and maintain sewer laterals; however, the Authority has design standards on the correct installation of sewer laterals.

Authority's current business practice score for ED is 3.7. Authority understands the practice and has implemented a program that meets the proposed CMOM Rule.

Table 2-2 Engineering Design Business Practice Score

Business Process	Business Practice	Findings	Score
As-Built Plans	As-builts are kept on record and up-to-date.	The Authority has a regular updated program for maintaining as-built drawings.	4.0
Construction Inspection	Organization performs construction inspection.	Trained and qualified technical staff is proficient with respect to their job functions as it pertains to construction inspections. Develop written inspection procedures.	3.5
Condition Assessment	Process in place to prioritize the replacement and cleaning of pipe based on the condition.	Authority is in the process of developing a condition assessment program using a combination of methods. It currently prioritizes the replacement and cleaning of pipe through institutional knowledge of problem areas. The Authority has not completed a condition assessment of its assets. Under the settlement agreement with OMI the Authority will complete a system-wide condition assessment program.	3.0
Condition Assessment	Clearly identify the owner of service lateral from the house (private property).	Property lines are identified for residential areas.	4.0
Rehabilitation/Replacement	Acceptance testing for rehabilitated pump stations, wastewater mains, manholes, and force mains.	The Authority has a method in place to test rehabilitated assets.	4.0

Additional Assessment Findings

The Authority understands the wastewater practices under ED and will be implementing a condition assessment program of its assets within the next 24 months. The Authority should consider looking at its long term strategy in evaluating the condition of assets once the initial program has been completed by OMI.

The condition assessment work that will be completed by the Authority will be consistent with the guidebook titled "Implementing Asset Management – A Practical Guide." Specifically, condition assessment of the Authority's assets will be critical and will include the following:

- Vertical asset inspection will include inspecting lift stations. Onsite condition assessment will be conducted on approximately 1,600 component assets and in 27 lift stations. Condition assessment will make general observations for safety and general facility condition. No detailed structural assessment is included as part of this assessment.

All incoming and out-going collection system pipe assets will be inspected to the extent and reach permitted by the IMX technology (or Quick-View technology in the case of inaccessible off-road manholes) and in-situ conditions encountered. The technology being used will not allow for inspection of sewer lines on manholes greater than 25 feet deep. During the inspection of the pipe, when the clear view of the pipe inspection is obstructed by maintenance related conditions such as excessive grease, debris, roots, sewer line collapses etc., the work will be abandoned and crews will move to the next segment of pipe. Sanitary Sewer Assessment data shall conform to the PACP coding standard and will be delivered and imported to the GNHWPCA GIS database and new CMMS software.

During the inspection, the following three areas of observations will be recorded:

1. Maintenance – Roots, Debris, Grease, Blockage, Utility Penetrations
2. Structural – Offset, Protruding Service Tap, Drop Service Lateral, Pipe Sag, Horizontal Deflection, Vertical Deflection, Flat / Reverse Pipe Grade, Longitudinal / Circular Crack
3. I/I – Active I/I at Pipe Joint, Active I/I at Manhole Seal, Active I/I from Service, Active I/I from Pipe Crack, Inactive I/I Staining.

During the inspection, pipe characteristics such as diameter and material shall be field checked against GNHWPCA's asset inventory. Other observations will include verification of flow direction and approximate flow depth and velocity. The goal of this effort for the Authority is to provide a complete condition assessment using the "lamping" technology.

All video is inspection completed will be rated by in-house personnel certified using PACP coding standards. For each deficiency coding shall be used to grade the condition of the pipes. Condition grades described as potential for blockage shall be used to grade pipes. This will allow crews to prioritize cleaning and rehabilitation efforts.

2.2 Satellite Communities and Sewer Use Ordinance (SUO)

CMOM requires that communities receiving flow from satellite communities have formal agreements with these communities. Such agreements must include provisions governing the quantity of flow into the system, dates of termination and renewal requirements, and industrial and commercial discharge limits. CMOM also requires that the Authority and its satellite communities have a Sewer Use Ordinance (SUO) that provides rules and regulations for the community (Appendix B – GNHWPCA Sewer Ordinance).

The Authority's Sewer Ordinance provides for the regional planning design, construction, management, operation and maintenance pertinent to the collection, conveyance, transportation, storage, pumping, treatment and disposal of sanitary

sewage and high strength wastewater. The Sewer Use Ordinance (SUO) establishes guidance on collection system operation. It provides legal authority to protect the system through control of connections and discharges to the system, two important issues that can affect treatment plant regulatory compliance if not well managed.

In addition to treating its member communities, the Authority also treats the wastewater from two satellite communities, the towns of North Branford and North Haven through an Inter-Local Agreement (IGA), where the Authority provides contract services for the wastewater treatment and disposal of wastewater. Under the proposed CMOM rule, these communities are considered satellite communities and the Authority must be able to control the maximum flow introduced into its collection system from these two communities sent to the East Shore Water Pollution Control Abatement Facility (ESWPCA). The IGA require satellite communities to comply with Authority standards; however the Authority has limited authority regarding the condition and maintenance of the satellite community wastewater collection systems.

The Authority has a Sewer Use Ordinance (SUO) with standards for inspection and approval for new connections to the wastewater system. The Ordinance contains procedures for inspection as well as standards for building and sewer permit issuance. It also contains general prohibitions of material described below.

- ☑ Fire and explosive hazards
- ☑ Corrosive materials
- ☑ Oils or petroleum
- ☑ Obstructive materials
- ☑ Material that may cause interference at the wastewater treatment plant

The SUO also contains general procedures and enforcement actions for illegal connections, defects in service laterals located on private property, sump pump connections, and building structures over the sewer lines.

The Authority's current business practice score under SUO is a 4.5. The Authority understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule.

Table 2-3 Sewer Use Ordinance Business Practice Score

Business Process	Business Practice	Findings	Score
Sewer Use Ordinance	The organization complies with applicable rules/regulations.	The Authority has a SUO in place and complies with applicable rules/regulations.	4.5
Illicit Discharge	Provisions that prohibit introduction of high strength waste by waste haulers.	The Authority prohibits the introduction of high strength wastes as part of the requirements of the Ordinance.	4.5
Intermunicipal Agreements	Agreements with communities that convey wastewater to the POTW.	The Authority has inter-local agreements with communities that convey wastewater through their system to the Regional POTW.	4.5

Additional Assessment Findings
The Authority has adopted SUO and agreements for the conveyance of wastewater through its system to its wastewater treatment plants.

2.3 Organizational Structure (OS)

CMOM requires a utility to have an Organizational Structure (OS) that supports its implementation and demonstrates the duties and responsibilities of the positions within wastewater collection system operations.

The main office of the Authority is currently located at 345 East Shore Parkway, New Haven CT. The Authority was created in August 2005 and is organized in accordance with the Connecticut General Statues (CGS or the "Statutes") Sections 22a-500 through 22a-519. The purpose of the Authority is to further the environmental protection laws of the State of Connecticut and to gain efficiencies and economies of scale with respect to the planning, design, construction, management, operation and maintenance of the Regional Wastewater System.

The FY2008 Annual Operating Budget contains the necessary funds for 34 full-time employees. The following table identifies the number of employees in each of the functional areas.

Table 2-4 Number of Employees in each Functional Area

Functional Area	Number of Employees
Executive Director's Office	4
Finance & Administration	14
Engineering	6
Operations	10
Total	34

The Executive Director's Office employees include the Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP) Office of Capital Projects personnel. The Finance and Administration employees include billing, collections and customer service personnel. Of the 10 operations employees, seven provide field services and are under the supervision of Operations Management International, Inc. (OMI), the Authority's contractor responsible for the day-to-day operation and maintenance of the treatment and collection system.

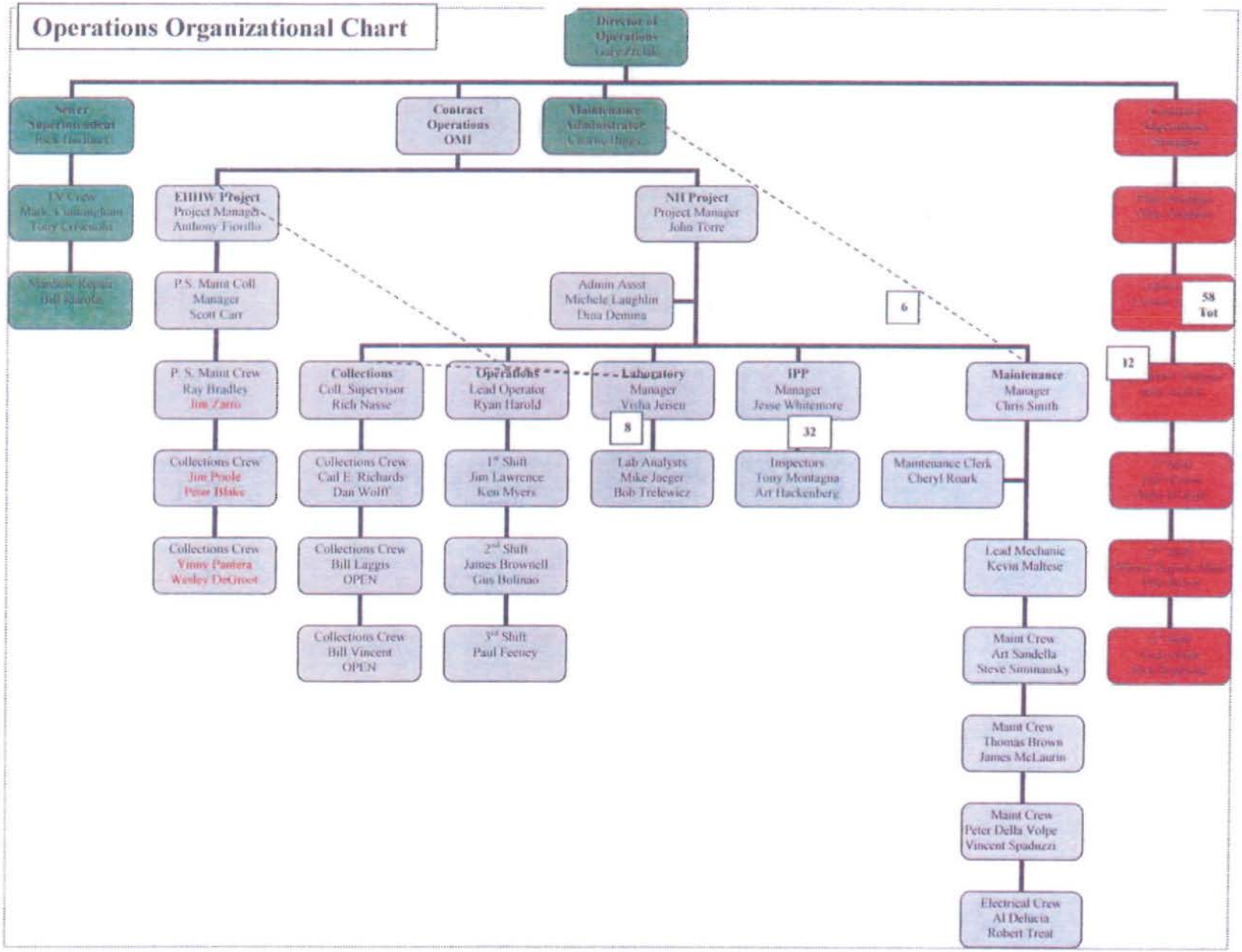
CMOM requires a manpower and staff organizational structure that supports the implementation of its program. The organization must relate to the duties and responsibilities of the positions within the Authority.

The Director of Operations is responsible for the implementation of the CMOM program on the wastewater collection system and oversees the long term agreement with OMI. The comprehensive agreement with OMI provides for the operation, maintenance and management of the System, including ESWPCF, pump stations and collection systems. This agreement establishes performance and reporting requirements for the operation and maintenance of the System. The agreement requires the implementation of a maintenance management program to include preventive, predictive, and corrective maintenance for all components of the System, including:

- Building, grounds, and structures
- Electrical systems and instrumentation
- Mechanical equipment
- Odor control systems
- Sewers and manholes
- Vehicles and other related rolling stock
- Laboratory, monitoring and sampling equipment
- Heating, ventilation, and air conditioning
- Communication equipment (i.e. telephones, facsimiles, etc.)
- Computer systems
- Chemical feed systems
- Pumping systems
- Auxiliary power facilities
- Air pollution control devices
- Supervisory Control and Data Acquisition (SCADA) facilities
- Other specialized tools and equipment

The Authority has an organizational structure with the personnel in place to implement CMOM Program Operations and Maintenance components. Based upon this assessment of the Authority's staff capabilities, the Authority through OMI has an organizational structure with the personnel in place to implement certain CMOM program components. These components include physical inspection and testing procedures to be used to routinely inspect and maintain the Authority's Collection System including pumping stations, force mains, siphons, emergency generators, alarms, telemetry equipment, interceptor, manholes, sewer mains and respond to Sanitary Sewer Overflows. The Authority's wastewater collection system organization ensures the reliable conveyance of wastewater from individual dischargers to the wastewater treatment plant.

An overview of the organization structure of the Authority is shown in figure 2-2. The structure describes the functional areas responsible for implementing the CMOM Program. The Director of Operations is responsible for meeting the CMOM Program requirements through monitoring the agreement with OMI.


Operations Organizational Chart
Director of Operations
Sewer Superintendent
Contract Operations OMI
Maintenance Administrator
TV Crew
Manhole Repair
EIHW Project
Project Manager
Anthony Fiorillo
NH Project
Project Manager
John Torre
P.S. Maint Coll
Manager
Scott Carr
Admin Asst
Michele Laughlin
Dina Demma
6
58
Tot
12
P. S. Maint Crew
Ray Bradley
Jim Zarro
Collections
Coll. Supervisor
Rich Nasse
Operations
Lead Operator
Ryan Harold
Laboratory
Manager
Vesha Jensen
8
IPP
Manager
Jesse Whitemore
32
Maintenance
Manager
Chris Smith
Collections Crew
Jim Poole
Peter Blake
Collections Crew
Carl E. Richards
Dan Wolff
1st Shift
Jim Lawrence
Ken Myers
Lab Analysts
Mike Jaeger
Bob Trelewicz
Inspectors
Tony Montagna
Art Hackenberg
Maintenance Clerk
Cheryl Roark
Collections Crew
Vinny Pantera
Wesley DeGroot
Collections Crew
Bill Laggis
OPEN
2nd Shift
James Brownell
Gus Bolinao
Lead Mechanic
Kevin Maltese
Collections Crew
Bill Vincent
OPEN
3rd Shift
Paul Feeney
Maint Crew
Art Sandella
Steve Smimansky
Maint Crew
Thomas Brown
James McLaurin
Maint Crew
Peter Della Volpe
Vincent Spadazzi
Electrical Crew
Al Delucia
Robert Treat

The Director of Operations has a Sewer Superintendent responsible for the management of the wastewater collection system. The Superintendent oversees the OMI Contract for the collection system. Besides the OMI contract, the Superintendent is also responsible for inspecting the installation of new lateral services and overseeing the contract for mainline point repairs.

The Maintenance Administrator is responsible for overseeing OMI's performance on the pump stations. There are three areas within pump station maintenance which includes facilities, mechanical and electrical. OMI employees have developed the skills and expertise to perform a wide range of work. These individuals observe and verify the operation of all systems in the stations; performance maintenance not requiring access to the electrical systems or dismantling and repair of equipment that requires specialized skills; and ensuring overall station reliability and availability. OMI personnel have a broad background and understanding of the multitude of equipment and systems in a station to meet the CMOM rule.

The Authority management is responsible for determining the goals, policies, and procedures of operations and maintenance of the wastewater collection system, working closely with OMI to implement this strategy. The Authority through OMI has up-to-date job descriptions available that delineates responsibilities for each position. Each job description provides the following information:

- Description of work
- Necessary special qualifications or certifications
- Pertinent information
- List of licenses required for the position/criteria

Job qualifications, such as state licensing, exist for treatment plant staff, but not for collection system personnel. OMI has a low vacancy rate and minimizes the amount of time to hire in staff to fill vacant positions.

The Authority's current business practice score under OS is a 4.3. The Authority understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule.

Table 2-5 Organizational Structure Business Practice Score

Business Process	Business Practice	Findings	Score
Organizational Chart	An up-to-date organizational chart exists.	Authority has an organizational chart that is up-to-date (changes are made immediately as personnel/ positions change).	5.0
Job Descriptions	Up-to-date job descriptions that delineates responsibilities and Authority for each position.	Authority through OMI has up-to-date job descriptions. Job descriptions delineate responsibilities for each position.	4.0
Proficiency	Staff is knowledgeable of their respective positions.	Interview with personnel indicated that employees are aware of their job requirements and generally proficient.	4.0

Additional Assessment Findings
Under the current organization Authority has an organization structure and personnel in place to implement CMOM program components. No additional assessment findings.

2.4 Internal Communication (IC)

CMOM requires Internal Communication (IC) between management and its employees. This requirement includes a method to keep individuals in the organization informed on the day-to-day business practices. It also requires that personnel are capable of communicating with each other during normal and emergency situations through the use of compatible communication equipment.

The Authority and OMI use a variety of methods to communicate with its staff. Typically, communication with employees occurs on a daily basis, through bulletin board announcements, e-mail (limited), radios, and cell phones. Daily meetings often involve first line supervisors meeting each morning with personnel to identify any management issues from the previous day, and to discuss schedules and upcoming issues. Annual performance reviews are conducted for all OMI employees. A performance appraisal process is in place for Authority employees. The Authority regularly communicates with other municipal departments on projects, including outside agencies, i.e., Connecticut Department of Transportation (CDOT), member communities.

The Authority has a project review meeting with OMI on a monthly basis. At this meeting discussion is on the overall contract performance and any issues facing the wastewater collection system. OMI monthly performance reports are also reviewed at this time.

Inquires and complaints from customers, including those associated with sewer back ups and sewer overflows, are handled through the OMI staff located at the treatment plant. This provides customers a centralized contact point for notification of system overflows or questions/concerns related to system performance and maintenance problems. OMI personnel are dispatched to respond to sewer related problems, and a service request/work order is created through the Computerized Maintenance Management System (CMMS) once the problem is fully understood by personnel. The work is automatically prioritized within the system and reviewed by OMI staff based on the severity of the problem. Once the work has been completed, the crew will close out the work order. If the customer is available, field personnel will meet to discuss the problem with the customer. After-hour calls are received and handled by after-hour's on-call staff.

The Authority's current business practice score under IC is a 4.0. The Authority understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule.

Table 2-6 Internal Communication Business Practice Score

Business Process	Business Practice	Findings	Score
Employee Communication	Regular communications with employees on scheduling, safety, training, and customer service.	Authority through OMI has daily meetings with employees to review daily and weekly schedules, discuss training, and customer service issues.	4.0
Employee Performance Reviews	Annual performance reviews.	Annual performance reviews are completed by supervisors.	4.0

Additional Assessment Findings
Authority does not have a complaint management program that uses standard forms, customer follow-up, and a central location for complaint records. The public is informed and aware of wastewater activities, major construction, and maintenance that may be taking place on the system.

2.5 Budgeting (BUD)

CMOM requires the wastewater utility have a budget that will sustain the overall wastewater collection system O&M. Specifically, this must include an annual O&M budget, a Capital Improvement Program (CIP) that provides for wastewater collection system repairs/replacements on a prioritized basis, and a budget for Authority related problems.

The customer base served by the authority consists of a diverse mix of residential and commercial customers. The customer base also includes a portion of the Town of North Branford, and several homes from North Haven, which discharge into Authority's sewage collection system.

Customers of the Regional Wastewater System are classified according to the nature of their use of water. All homes, dormitories and apartment buildings are classified as "residential", all manufacturing enterprises in which water is used as part of the manufacturing process are classified as "industrial", and all business and institutional enterprises other than those classified industrial are classified as "commercial". The Authority's customers are billed quarterly for service based on their metered water consumption, as reported by the Regional Water Authority (RWA).

The total number of customers in the service area has remained and is projected by the Authority to remain relatively constant over the next several years. To maintain a conservative financial projection, the amount of billable metered water consumption is projected to be 9.35 million ccf annually. Table 2-7 contains a summary of the adopted rate structure for the Authority for FY 2008 as compared to FY 2007 and FY 2006.

Table 2-7 Rate Structure

Description	FY2006	FY2007	FY2008
Rate per ccf Billed Water Use	$1.84	$2.14	$2.31
Administrative Charge per Account per Quarter	$13.00	$13.00	$13.00

Minimum ccf	15	15	15
Minimum Bill (quarterly)	$40.60	$45.10	$47.65

The Authority's Operation and Maintenance (O&M) expenses include expenses incurred through the functions of operating and maintaining the Authority, which include personnel (includes salaries, fringe benefits, and overtime), supplies (general office, miscellaneous supplies and sewer material supplies), utilities, equipment and vehicles, travel, contracted O&M services, and other contracted services (i.e., auditing services, legal services, insurance, collection fees, etc.), payments-in-lieu-of-taxes, and billing and administrative expenses. The method to project future O&M are based on historical expense levels. The projections include the contract operation of the sewage collections systems by OMI.

The Authority's current business practice score under BUD is a 4.5. The Authority understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule.

Table 2-8 Budgeting Business Practice Score

Business Process	Business Practice	Findings	Score
Budgeting	Various individuals have input into the budgeting process.	Budgeting input is solicited from staff within Authority.	4.5
Rate Analysis	Rate analysis is performed regularly.	Rate studies are performed regularly.	4.5
Cost of O&M	Previous year expenditures are taken into account.	Previous year expenditures are reviewed and considered in future operations and maintenance expenditures.	4.5

Additional Assessment Findings
Authority has a budget that is capable of financing its future O&M and CIP and plans to increase its funding of future Capital Projects.

2.6 Training (TR)

CMOM requires the wastewater utility have a program to train new and existing employees on the proper procedures to operate and maintain the wastewater collection system. Specifically, this must include an annual training plan and schedule on wastewater collection system skills training, and a means to measure the success of the training program.

Sources of Training

OMI's training program includes the following areas:

- Manufacturer
- In-house
- On-the-job (OTJ)
- Industry-wide (e.g., consultants, regulatory authorities, professional associations, or educational institutions)

An appropriately-trained staff is critical to CMOM compliance. Employees that are trained are more likely to respond to emergencies appropriately and not exacerbate

problems. In addition, well-trained employees are more likely to follow proper O&M procedures, minimizing the likelihood of overflows.

The following are key elements of Authority current training program:

- Fundamental mission, goals, and policies are addressed by management
- Mandatory training requirements are identified for key employees by OMI
- On-the-job training progress and performance are measured and kept up-to-date by OMI and a report is issued to the Authority for review
- Effectiveness of the training is assessed through testing, drills or field testing
- New employees receive immediate training on safety and equipment operations

Authority provides training programs that are specific to the wastewater industry. Technical training includes: administrative, equipment operation, certification and customer service training. Authority also uses vendors to train staff for operation of equipment. Newly hired employees are provided immediate training in safety procedures and how to operate small equipment. Authority provides the following training for its personnel:

- Routine line maintenance that consists of on-the-job training and vendor equipment training
- Computer Training
- Administrative Recordkeeping
- Pump O&M
- Electrical and instrumentation, which is a combination of formal and on-the-job training
- Public relations and customer service
- Pipe repair
- Wastewater collection system certification

The Authority's current TR business practice score is 4.5. The Authority understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule' requirements.

Table 2-9 Training Business Practice Score

Business Process	Business Practice	Findings	Score
Technical Training	Technical training is available and conducted.	OMI identifies technical training and completes it on an annual basis.	4.5
Identified Training	Training is identified for key positions.	OMI identifies specialized technical training for key positions (pump station maintenance).	4.5

Certification Requirements	Certification is required for wastewater personnel.	Certification training is in place using the CSUS manuals. It is documented by OMI and reported annually.	4.5

Additional Assessment Findings
OMI provides training for its employees and addresses areas that are directly related to meeting CMOM requirements. There is immediate training for new hires in the proper use and operation of equipment and customer interaction. OMI has a significant role in the actual training and coordination of training for their personnel. Training programs are essential to keeping personnel up to date on wastewater practices and any changes in the industry. Authority should continue to include its staff in OMI's training programs. Considering a separate program would not be an efficient use of resources.

2.7 Safety (SAF)

CMOM requires a comprehensive Safety (SAF) program that consists of, at a minimum, a written safety policy, a safety officer, and standardized reporting forms.

Potential safety hazards in the collection systems are many and varied. Personnel should be aware of potential hazards and be able to protect themselves from these hazards to the greatest extent possible. Authority has a safety policy and training program through OMI. There is a Safety Committee and daily tailgates. Safety training records are kept up-to-date and a report is submitted to the Authority on an annual basis documenting the training program.

OMI has written procedures in the following areas:

- Lockout/tagout
- MSDS sheets
- Biological hazards in wastewater
- Traffic control
- Confined space
- Trenching and excavation
- Pneumatic and hydraulic systems safety
- Chemical handling

Safety training involves tail gates, safety classes, and vendor demonstrations. Each employee's annual safety program performance is recorded and kept on file with OMI. In general, OMI has a well developed safety training program in place.

The Authority's current SAF business practice score is 4.8. The Authority through OMI understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule's requirements.

Table 2-10 Safety Business Practice Score

Business Process	Business Practice	Findings	Score
Safety Officer / Authority	A safety officer exists.	A safety officer exists within OMI. OMI and Authority managers are active in the safety program.	5.0
General Safety Procedures	General safety procedures exist and are followed according to the safety practices.	General safety procedures are in place and followed according to the safety practices. Authority should consider looking at a program that will include its entire staff (Inspectors, Staff).	4.0
Safety Equipment	The necessary safety equipment to perform all job functions.	Safety equipment is available and used by personnel.	5.0
Safety Performance Measures	Performance measures on safety.	Performance measures are in place with the program managed by the Authority.	5.0

Additional Assessment Findings
Authority through OMI continues to be very involved in managing the safety program. This involvement is critical to overall well being of staff reporting to OMI.

2.8 Customer Service (CS)

CMOM requires that the utility have a Customer Service (CS) and public relations program, and a program to track and record customer service issues.

The Authority does not have a formal Customer Service program in place that provides customer service training and written procedures to its personnel. There is a practice to notify customers prior to and during construction of wastewater mainline in the system. The Authority will keep customer complaint records and detail the complaint and when the problem was resolved by personnel. The following is kept on individual complaints through the work order system:

- Person who received the complaint
- Name, address, and telephone number of customer
- Nature of complaint or request
- Location of problem
- Person/group assigned
- Date action was assigned
- Date of complaint and cause of problem

Currently, during normal business hours, customer calls are received at the Authority's principal office, 345 East Shore Parkway, New Haven, CT. The Authority has acquired an office building and will be consolidating its administrative offices at this location. Two phone numbers roll to 5 separate extensions at the Authority's Customer Service Center. Customers are provided with three separate numbers on their bills: General, Service, and Billing. After hour calls are directed to the treatment plant that is staffed on a 24-hours basis and OMI will handle these calls.

Complaint response time goals are not measured, however when a call is received field personnel will attempt to reach a customer complaint within 20 minutes. This number is not tracked and measured on a per call basis. Calls after normal working hours (7:00 AM – 3:30 PM) are handled and responded to by on-call personnel.

Currently, there is a Request for Proposal to purchase and implement a Customer Information System (CIS). This system will be installed and located at the new Authority Administration Building.

Authority current CS business practice score is 2.80. The Authority does not have a formal Customer Service Plan to be used in handling different customer service scenarios.

Table 2-11 Customer Service Business Practice Score

Business Process	Business Practice	Findings	Score
Complaint Management	Complaints are prioritized and categorized.	Authority has an organized procedure for receiving and logging complaints.	4.5
Customer Service Responsiveness	The organization has a goal in responding to a customer service complaint.	Authority does not have a goal to record the time to respond to a complaint.	2.0
Customer Service Policy	The organization has a written and up-to-date customer service policy.	Authority does not have a formalized written document.	2.0

Additional Assessment Findings
Authority should consider developing a written document that details customer service issues.

2.9 Equipment and Collection System Maintenance (ESM)

CMOM requires that adequate maintenance facilities and equipment be available to support personnel in maintaining the wastewater collection system. CMOM also requires that records and information are kept for all equipment.

Currently, the Authority owns equipment used by OMI to clean and maintain the collection system. It was indicated by OMI that the equipment is on a scheduled preventive maintenance program based on miles and/or engine run time. There is a system in place to prioritize the maintenance of a piece of equipment. OMI is responsible for scheduling the maintenance on each piece of equipment. Maintenance records are not kept on all equipment.

The Corrective work orders on the wastewater collection system are not backlogged for more than 30 days. Based on the annual report OMI spends roughly 90% of its time performing corrective and preventive maintenance work on the collection system.

A work order system exists for planning and scheduling of the sewer main and service repairs, and manhole repairs in the wastewater collection system. These work orders are grouped by location, mainline versus dead-end, and whether or not the repair will require overtime. Criticality is rated based on flow rate (pipes with higher flow get priority).

When work involves outside agencies, Authority personnel will coordinate with these agencies.

The Authority's current ESM business practice score is 3.33. The Authority understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule's requirements.

Table 2-12 Equipment and Collection System Maintenance Business Practice Score

Business Process	Business Practice	Findings	Score
Vehicle Purchase and Repair	There is a process in place to facilitate vehicle purchase and repair.	A process exists to facilitate the vehicle purchase and repair. No written formal process is in place.	3.0
Equipment Purchase and Repair	There is a process in place to facilitate equipment purchase and repair.	A process to purchase equipment. Authority staff is involved in the process of selecting a piece of equipment.	4.0
Tools Purchase and Inventory	Process in place to facilitate purchasing of tools and the whereabouts of tools tracked.	No formal written procedures are in place for the purchasing of tools. Tools are not electronically tracked.	3.0

Additional Assessment Findings
Authority meets this CMOM requirement and continues to purchase and replace equipment on a scheduled basis.

2.10 Equipment Parts Inventory (EPI)

CMOM requires that critical spare parts be identified, a sufficient adequate inventory of parts and material be available for normal and emergency system repairs, and equipment be standardized for use by personnel.

The Authority through OMI maintains an inventory of parts, materials, and spares pumps in a location at the wastewater treatment plant. The Authority through OMI has strong relationships with local vendors and able to purchase parts if necessary. The current method used to purchase and house spare parts supports the Authority's maintenance programs. Parts and material costs are tracked manually and will eventually be automated with the implementation of the new CMMS. OMI staff indicated that it has an accurate inventory count of its equipment parts, and has established ordering points.

Authority has sufficient facilities for equipment and manufacturers manuals, and keeps a minimal number of spare parts on hand in a clean, well protected stock room. Staff has knowledge and access to critical spare parts and maintains an inventory of these critical spare parts or has immediate access to a local vendor. In the event that emergency repairs in the system are required, the Authority has readily available contractors to assist.

The Authority's current EPI business practice score is 2.5. The Authority does not have a formal program for spare parts and needs to develop a program to meet the proposed CMOM Rule.

Table 2-13 Equipment Parts Inventory Business Practice Score

Business Process	Business Practice	Findings	Score
Spare Parts Purchase and Inventory	There is a process or program in place to facilitate spare parts purchasing, which includes the criteria used for purchase. The whereabouts of spare parts are tracked.	There is no formal process for spare parts inventory. No formal procurement procedures exist.	2.5
Supplies Purchase and Inventory	There is a process or program in place to facilitate purchasing supplies. The whereabouts of supplies are tracked.	There is no formal process for supplies and procurement procedures exist.	2.5

Additional Assessment Findings
Critical spare parts and supplies have been identified and available for both normal and emergency operations. When possible, all parts are standardized. Authority is implementing a new CMMS and this system will have the capability to track inventory of spare parts and supplies.

2.11 Information Management System (IMS)

The CMOM Information Management System (IMS) requirement is to have a system in place to track maintenance activities, either electronically or through a good paper system. CMOM encourages the use of efficient information management systems to track work activities at the Authority.

The Authority recently completed an Information Technology Strategic Plan that provided the Authority with a clear and prioritized plan in meeting its future Information Technology needs. The plan provides a prioritized list of IT improvements that incorporate changes in systems and how the systems integrate, as well as change the current Authority business processes. The Authority will purchase and implement both a new Customer Information System (CIS) and a Computerized Maintenance Management System (CMMS). These two systems are examples of systems not currently owned by the Authority but will provide the Authority the ability to manage access data and information.

Currently, the Authority through OMI uses a Computerized Maintenance Management System (CMMS) to track its work order activities. All work is tracked either manually or electronically. Records are maintained for more than 3 years. Work activities can be distinguished between emergency and routine. Written instructions on how the OMI tracks its work related to various activity types exist. Written instructions also exist for using the CMMS (e.g., accessing information, entering records, and developing and printing reports). The CMMS has the capability to automatically update information. The following written instructions are available for managing and tracking information related to the following key processes:

- Complaint work orders
- Scheduled work orders
- Customer service
- Compliance/overflow tracking
- Sewer system inventory
- Safety incidents
- Parts inventory
- Equipment / tools tracking

The Authority's current IMS business practice score is 4.25. The Authority understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule.

Table 2-14 Management Information System Business Practice Score

Business Process	Business Practice	Findings	Score
Information Management Operations & Maintenance	There is an information management system in place to track O&M records.	Information management system in place to track O&M records.	5.0
Information Management Complaints	There is an information management system in place to track complaints.	Complaints are tracked.	4.0
Information Management System wide	Information management system in place to support management decisions.	System is in place.	4.0
Information Management Financial	There is an information management system in place to track costs and budget.	Financial system in place to track costs and budget.	4.0

Additional Assessment Findings
Authority through OMI currently has both an electronic and a paper system to track its work activities. Information is recorded and the status of the job is tracked until completion.
The Authority is in the implementation phase of new work management software to track its work activities. The software will be implemented over the next eighteen months and will allow the Authority complete access to work order data.

2.12 System Mapping (MAP)

CMOM requires that "as built" plans or maps are available for use by personnel, and that the utility has a process in place to update changes to maps in a timely manner. Maps should have specific information and a numbering system for sewer assets on the maps.

The Authority has electronic maps available for use by field personnel. The Authority is moving toward completing the Geographic Information System (GIS), which will be used in planning and scheduling of work and to electronically map sewer problem

Maps used by personnel are complete and include the following information for personnel:

- ☑ Scale
- ☑ North arrow
- ☑ Date map was drafted
- ☑ Date of last revision
- ☑ Service area boundaries
- ☑ Other landmarks (roads)
- ☑ Manholes and access points
- ☑ Street Names
- ☑ SSOs occurrences
- ☑ Flow monitors
- ☑ Force mains
- ☑ Pump stations
- ☑ Main, trunk, and interceptor sewer
- ☑ Distance between manholes
- ☑ Pipe material
- ☑ Pipe diameter
- ☑ Installation date
- ☑ Slope
- ☑ Manhole rim elevation
- ☑ Manhole coordinates

The Authority's current MAP business practice score is 4.5. The Authority understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule.

Table 2-15 System Mapping Business Practice Score

Business Process	Business Practice	Findings	Score
Sewerage System Maps	Sewerage system maps are kept on record and up-to-date.	Maps are updated on a regular basis.	4.5
Systematic Numbering and Identification Method	Sewerage system maps have a systematic numbering method for identifying sewer system manholes, sewer lines, and other items.	Sewerage system maps have a systematic method to number the maps with the assets of the system. The GIS system is currently being updated.	4.5

Additional Assessment Findings
Authority has electronic maps that are used by field personnel in their daily work.

2.13 Internal TV Inspection (TVI)

CMOM requires an internal TV Inspection (TVI) program that characterizes the condition of piping and structures along sewer lines. The TVI program requires written operation procedures and guidelines, and a method to rate the defects found during the inspection process.

The following table describes the information the Authority routinely collects during the routine internal inspection of a wastewater collection main:

- ☑ Pipe size, type, length, and joint spacing
- ☑ Distance recorded by internal TV
- ☑ Results of the internal TV inspection
- ☑ Internal TV operator name
- ☑ Cleanliness of the line
- ☑ Location and identification of line being televised

Authority has trained its personnel in a standardized the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) and the Manhole Assessment and Certification Program (MACP). Even though trained in the overall process, the Authority does not have a comprehensive televising program to televise its underground collection mains on an annual basis and has not established an annual televising target for its mains. The Authority working through an agreement with OMI is in the process of developing a comprehensive inspection plan over the next 24 months, which is discussed in the long term CMOM plan. This program will use lamping technology to identify and assess the condition of the wastewater collection system lines.

Table 2-16 Existing Mainline Televising Program

Existing Televising	2003	2004	2005	2006	2007
Total Feet Televised	N/A	N/A	N/A	N/A	N/A
Annual Frequency					

The Authority's current TVI business practice score is 2.67. The Authority needs to formalize its televising program.

Table 2-17 Internal TV Inspection (TVI) Business Practice Score

Business Process	Business Practice	Findings	Score
Condition Assessment CCTV	The organization does CCTV and information collected is reviewed to determine what actions, if any, are to be taken.	Authority does very little televising of its system.	2.0
Condition Assessment System Defect	Analysis of the condition of the collection system wastewater mains is performed.	Due to the lack of televising the overall condition of the wastewater collection is has not been evaluated based on CCTV information.	2.0
Rehabilitation / Replacement of Collection System	Criteria exist for determining rehabilitation or replacement of sewers.	Personnel have a condition index in ranking the condition of a wastewater collection. Personnel have been trained in the NASSCO Standards (PACP & MACP).	4.0

Additional Assessment Findings
Authority does not have a comprehensive in-house program to evaluate the condition of its sewer lines. Under an agreement with OMI the Authority is required to evaluate the condition of its collection system. Once this effort has been completed, the Authority will evaluate implementing an sewer mainline inspection program. This program should attempt to achieve an acceptable frequency of the sewer mainlines on an annual basis.

2.14 Sewer Cleaning (CLN)

CMOM requires that a cleaning plan be developed and updated to include the cleaning frequency, and the identification of routine problem areas and a plan to routinely clean these areas more frequently. CMOM seeks routine preventive maintenance activities to prevent service interruptions and establish a proactive maintenance program.

Sewer Cleaning Records

Authority's sewer cleaning records include the following:

- Date, time, and location of stoppage or routine cleaning activity
- Method of cleaning used
- Cause of stoppage
- Identity of cleaning crew
- Further actions necessary and/or initiated
- Weather conditions

Maintaining clean sewers is an initial objective of the Authority's preventive maintenance program. The Authority has approximately 556 miles of sewer mains to clean. In 2007 OMI cleaned approximately 71 miles of pipe. At this rate of cleaning, the frequency of the system wide cleaning program equaled every eight years. To clean the system, OMI is operating two vehicles to clean the system and it is estimated that each vehicle is cleaning approximately 1,500 feet of sewer main on an annual basis. The Authority has identified problem areas and will clean these on an accelerated basis (Appendix C - Frequently Cleaned Areas). By cleaning problem areas, the Authority has developed a proactive program to prevent the occurrence of an SSO.

Table 2-18 Annual Cleaning Program

Pressure Cleaning	2003	2004	2005	2006	2007
Total Feet Cleaned					374,880
Annual Frequency (%)					12.5%

The Authority has a FOG program for commercial establishments and is effective in providing information and reducing the amount of grease that is introduced into the system. The Food Preparation Establishments (FPE's) that discharge wastewater to the GNHWPCA system are required to comply with the State of Connecticut's Department of Environmental Protection "General Permit for the Discharge of Wastewater Associated with Food Preparation Establishments" that became effective September 30, 2005.

The Connecticut General Permit seeks to reduce Fats, Oils, and Grease from entering the public wastewater system from food service establishments through the use of:

- Outdoor In-Ground Grease Trap/Interceptor (1,000 gallon minimum), or
- Automatic Grease Recovery Unit (AGRU)

Authority's current CLN business practice score is 3.50. Authority understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule.

Table 2-19 Sewer Cleaning Business Practice Score

Business Process	Business Practice	Findings	Score
Cleaning Prioritization	There is a process in place to prioritize cleaning activities.	The prioritization process by Authority cleaning crews is in place and successfully meets the goals of the CMOM program. The new maintenance management system being implemented will also have the ability to continue managing the prioritization process.	4.0
Residential Easement	There is a program in place to maintain easements and ROW.	Authority does not have a program to maintain easements and clear them as needed; no written standard is in place.	2.0
Cleaning Videos	Cleaning is reviewed before and after using a CCTV.	Authority has limited televising and unable to evaluate how well the crews are cleaning the collection system..	3.0
FOG Program	There is a permitting program for FOG control in place.	The Authority has a FOG Program in place to eliminate FOG from the collection system.	4.0

Business Process	Business Practice	Findings	Score
FOG Program	Inspections are conducted.	The program has identified industrial users and performs inspection. Authority through OMI has 3 full-time inspectors working in its FOG program program.	4.0
FOG Program Public Education	The program in place to educate the public.	The Authority has a limited FOG public information program. It should expand the program to provide additional material to residents / multifamily units.	3.0
Pretreatment Program Performance Measures	Performance measures for the pretreatment program are in place.	Performance measures for the pretreatment program are in place.	4.5

Additional Assessment Findings
Authority has implemented a program to clean and identify problem areas within the wastewater collection system. ■ Authority needs to provide the total number of footage per cleaning unit. ■ Develop a standard for cleaning and clearing of easements. Many problems occur because a sewer is inaccessible and cannot be routinely evaluated. ■ The Authority needs to develop a program to educate the general public on the impact of grease on the system and the proper disposal, especially with apartments and condominium associations.

2.15 Manhole Inspection and Assessment (MAN)

CMOM requires that as an asset to the system, manholes should be inspected and deficiencies corrected as soon as possible.

The Authority through OMI has a limited Manholes Inspection and Assessment (MAN) program. On an annual basis the Authority does not have a set number of manholes to inspect but will inspect manholes when cleaning the collection system. OMI has proposed a manhole program through its Asset Management Assessment will be inspected by the crews' lamping the system. In the future, when personnel are cleaning the wastewater collection system and are recorded in the work management system. If a problem is identified, a corrective work order is generated and the work is prioritized by the Supervisor.

Authority's current MAN business practice score is 3.0. Authority understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule.

Table 2-20 Manhole Inspection and Assessment Business Practice Score

Business Process	Business Practice	Findings	Score
Manhole	There is a program to prioritize manholes for inspection.	Authority does not have a formal program that prioritizes manholes for inspection.	2.0
Manhole Inspection	The organization has inspection procedures for inspecting manholes.	Authority has a limited program in the inspection of manholes.	3.0
Manhole Testing	The organization has an acceptance testing criteria for rehabilitated manholes.	Authority has a program that tests rehabilitated manholes through the Engineering Division. The program is currently being developed as a separate contract to inspect all manholes.	3.0
Manhole Specifications	The organization has and maintains specifications for manhole construction.	The Authority has specifications for manhole construction and works closely with Engineering.	4.0

Additional Assessment Findings
Authority does not have a formal manhole inspection program in place and inspects manholes on an annual basis. The Authority has requested a proposal from OMI to inspect all of its manholes. The manhole structures will be inspected in the next 24-months from "top-side" without actual entry into the structure. Format for the manhole inspection shall follow the currently published NASSCO manhole assessment certification program (MACP). A full inspection of the entire structure shall be completed on the basis of all observable features using top-side visual survey and the use of IMX zoom camera for the entire portion of the manhole for all manholes accessible in roads. For manholes in easements or other off-road locations that are not reasonably accessible by the IMX zoom camera vehicle, a hand-held Quick-View unit may be utilized. Digital images of each structure will be captured along with a completed MACP-compliant manhole inspection form and a database in MACP format that can be imported into the GNHWPCA database. Digitized photo images of the manhole structure will be recorded and attached to the inspection record. Photographs will include the site location, upper structure, lower structure, and observed structural, O&M and active I/I defects. Additional data including materials of construction, manhole steps, observed utility penetrations (water, gas, storm sewer, etc.) and evidence of surcharging and overflows will be recorded. Once this effort has been completed, the Authority will evaluate implementing an annual manhole inspection program. This program should attempt to achieve a frequency of 25% of the system-wide manholes on an annual basis.

2.16 Pump Stations (PS)

CMOM requires that pump stations/lift stations be maintained and routinely inspected using best industry practices. In performing the work, it also requires that maintenance practice should be in place and that maintenance activities are tracked.

The Authority owns, operates and maintains 30 sewage pump stations. The pump stations range in size from 90 gallons per minute (gpm) up to 40 mgd. Appendix D provides a listing of the pump stations, their location and associated capacity.

The pump stations are operated and maintained by the Authority through OMI personnel. Pump stations are inspected daily, weekly, and monthly. These inspections include electrical and mechanical system preventive and corrective maintenance. OMI will use a daily inspection sheet to track the work that is performed at each station. A work order is generated issued based on the results of the inspection report (Appendix E - Pump Station Tour Sheet).

Preventive maintenance tasks for each pump station have been established and are currently scheduled. A SCADA alarm system has been installed at all lift stations and monitors information, which is transmitted to operators at the wastewater treatment plant in the event of a system failure and/or overflow events. Staff responds to any pump station alarm during normal business hours and after-hours. Backup generators are in place or available along with bypass pumping equipment.

The following preventive maintenance program elements are in place:

- A short-term repair program followed by rehabilitation/replacement for long-term operation
- A documented, scheduled evaluation and testing of electronic control systems
- A documented and systematic program for testing electrical loads and electrical equipment
- A documented, scheduled mechanical maintenance program for all pumping station equipment
- A documented, scheduled program for addressing pump station's structure needs such as cleaning, painting, and site maintenance

The pump stations have 100 percent pump capacity and redundancy and have no dry weather capacity limitations.

Authority's current PS business practice score is 4.0. Authority understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule.

Table 2-21 Pump Station Business Practice Score

Business Process	Business Practice	Findings	Score
Pump Station	The organization has an inspection procedure for inspecting pump stations.	Authority has a program that inspects the pump stations in the system.	4.0
Pump Station Testing	The organization has an acceptance testing criteria for rehabilitated pump stations.	Authority has a program that tests rehabilitated pump stations, working closely with Engineering.	4.0

Pump Station Specifications	The organization has and maintains specifications for pump station construction.	The Authority has specifications for pump station construction and works closely with Engineering.	4.0
Pump Station Condition Assessment	There is a program in place to assess the condition of the pump station.	Pump stations are assessed on annual basis.	4.0

Additional Assessment Findings
There is a pump station inspection program in place. The program incorporates a system for documenting and prioritizing routine maintenance activities to include all mechanical, electrical, control and structural assets associated with the wastewater pumping station.

2.17 Capacity Assessment (CA)

CMOM requires that the utility will have a program that will evaluate the capacity of the system with a comprehensive capacity assessment program.

The Authority does not have a permanent flow monitoring program that tracks the flow entering the system from neighboring communities and a routine flow monitoring program done for the determination of inflow and infiltration (I/I). Currently, the evaluation of the system's capacity is driven by new facilities being added to the system. There are requirements by Engineering that all sanitary sewer developments are designed within the current limits of the wastewater collection system. Additional capacity may be required based on the increased flow into the system. In the case where additional capacity is required as a result of development, the Authority's Engineering Department will require that improvements are made and paid for by the creating the system improvement.

Authority Water's current business practice score under CA is a 4.0. Authority understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule.

Table 2-22 Capacity Assessment Business Practice Score

Business Process	Business Practice	Findings	Score
Capacity Assurance Flow Monitoring	There is a program in place for conducting flow monitoring.	Flow monitoring is done on a case by case basis.	4.0
Capacity Assurance Modeling	Modeling is used to evaluate capacity of the wastewater collection system.	The Authority does not model the system and has determined that running a model is not in the best interest of the Authority.	3.0
Capacity Assurance Pump Station Performance	Pump stations are sized adequately for projected growth.	The interceptor and pump station system is master planned with respect to growth.	4.0
Capacity Assurance New Services	There is a program or process in place to assure capacity that allows new services.	The Authority has a means to determine whether a requested new service (development) will negatively impact wastewater collection system performance.	5.0

Additional Assessment Findings
The Authority is very involved in managing and assessing the capacity of the system to meet future growth. The assessment of the capacity of the system is critical to overall ability to provide reliable wastewater services to the communities.

2.18 Tracking SSOs (TRK)

CMOM requires that SSOs are tracked and documented by personnel. The effort in tracking SSOs requires that SSO information is kept for a 5-year period. It also requires that Authority identify the percent of SSOs discharged from manholes, main and trunk sewers, pump stations, and sewer laterals. Another requirement is developing an understanding of what caused the backups, i.e., debris, vandalism, FOGs, etc.

The Authority reported 66 SSOs in 2007 with none of these spills reaching any bodies of water or having significant impact on the community. The Authority records and documents all SSOs regardless of size. The following table describes the percent of overflows and their sources of over the past 5 years.

Table 2-23 Annual Sanitary Sewer Stoppages and Overflows

Month	Grease (ea)	Rags (ea)	Debris (ea)	Broken Main (ea)	Pump Station Failure (ea)	Roots (ea)	Lateral (ea)	Wet Weather (ea)	Total SSOs (ea)	Total Gallons (SSOs)
January	3	0	0	0	0	2	0	0	5	275
February	3	0	0	0	0	0	0	0	3	55
March	3	0	1	0	0	1	0	5	10	275
April	2	0	0	0	0	0	0	18	20	24,497
May	2	0	0	0	0	0	0	0	2	200
June	1	0	1	0	0	1	0	1	4	125
July	3	0	0	0	0	0	1	0	4	265
August	2	0	1	0	0	1	0	0	4	121
September	3	0	0	0	0	0	1	0	4	716
October	2	0	1	0	1	0	0	0	4	270
November	2	1	1	0	0	0	1	0	5	1,793
December	2	0	0	0	0	0	0	0	2	2,561
Total	28	0	5	0	1	5	3	24	66	31,153

Authority has identified the causes of the SSOs in the past 5 years and attempts to correct any system problem.

Authority's current business practice score under TRK SSOs is a 4.5. Authority understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule.

Table 2-24 Tracking SSOs Business Practice Score

Business Process	Business Practice	Findings	Score
Tracking SSOs	The organization documents and reports all SSOs regardless of size.	Authority tracks all SSOs regardless of size.	4.5

Assessment Findings
Authority tracks its SSOs and keeps a record of their locations. The Authority also identifies the location, the volume of an SSO and the causes of an SSO. This information is used to develop future maintenance strategies and capital improvement programs.

2.19 Overflow Emergency Response Plan (OERP)

The intent of CMOM and the Overflow Emergency Response Plan (OERP) is to provide a standardized course of action for wastewater collection system personnel to follow in the event of an SSO. CMOM requires that an OERP should describe the permittee's planned options for response, remediation, and notification measures under different SSO scenarios. At a minimum, the OERP should be designed to:

- Protect public health
- Protect the environment
- Establish guidelines for notification, assessment, and mitigation procedures

Identify SSOs – the overflow response plan should describe strategies for a wide range of potential system failures for receiving and dispatching information. This includes a description of the role of each participant in the response, at the beginning when a complaint or incident report is received and continuing through a satisfactory response to the incident.

Provide immediate response and emergency operations–the plan should describe strategies for a wide range of potential system failures to mitigate the impact of SSOs as soon as possible by mobilizing labor, materials, tools, and equipment to investigate reported incidents, and document findings and responses.

Types of Portable Emergency Equipment

The Division's portable emergency equipment includes the following:

- Bypass Pumps
- Portable generator
- Air compressor, trailer-mounted
- Sewer flushing machine
- Portable lights and hand tools
- Truck (1-ton) and trailers
- Vacuum truck
- Repair equipment for excavation (backhoe, shoring equipment, concrete mixers, gasoline operated saws, traffic control equipment, etc.)
- Confined space entry gear

Provide appropriate and immediate notification to the public, health officials, other affected entities and the NPDES Authority - the emergency response plan requires a framework describing how Authority Water will notify the public, as well as other entities of overflows that may imminently and substantially endanger human health. The plan should also identify appropriate authorities at the local, county, and state level to receive notification. The plan should ensure that appropriate personnel are adequately trained to implement the plan.

The current plan, Appendix F, is available and is being updated. Specifically, the Plan will be updated to include the following elements:

- *Overflow Response Procedures* - A description of detailed procedures to be followed in the event of an overflow.
- *Notification Procedures* - Emergency Notification Procedures and description list and contact information of all individuals to be notified in the event of an overflow situation.
- *Incident Reporting* - A description and copy of all the forms and required reports that need to be filed in the event of a wastewater overflow.
- *Distribution and Updating Procedures* - A description of procedures on how to distribute and maintain the SSO response plan.

Authority Water's current OERP business practice score is 4.0. Authority understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule.

Table 2-25 Overflow Emergency Response Plan Business Practice Score

Business Process	Business Practice	Findings	Score
OERP Planning Steps and Tasks	An overflow response plan that shows steps and tasks for response.	Authority through OMI has an existing plan. The Authority may consider having a separate plan.	4.0
Public Notification	An overflow response plan that explains procedures in notifying the public.	Authority through OMI has notification procedures in place.	4.0
Emergency Flow Control	An overflow response plan that explains how to manage overflows (mitigation).	Authority through OMI has a plan to mitigate and manage the flow from an SSO.	4.0
Preparedness Training	A plan that describes training of the plan.	Authority through OMI has an existing plan that is used to train its personnel.	4.0

Additional Assessment Findings
Authority through OMI has an OERP and may consider developing its own plan. This plan would be coordinated with OMI's but begin to establish procedures on how the Authority and the contract operator manage an emergency situation.

2.20 Smoke and Dye Testing (SDT)

CMOM requires testing of the wastewater system using different methods. One method to inspect for I/I using smoke and dye testing to provide information on extraneous flows into the system. The Authority does have a dye testing program in place; however, it is only done for diagnosing a depression or cavities failure and the early stages of a failure.

The Authority does not use smoke or dye testing in evaluating its collection system.

Table 2-26 Smoke and Dye Testing Business Practice Score

Business Process	Business Practice	Findings	Score
Smoke and Dye Testing	Utility have a smoke and dye testing program.	Authority uses dye to identify flows entering its system.	N/A

Assessment Findings
Authority does not perform smoke and dye testing program as means to evaluate the condition of its system. Authority's primary method of testing and observing is by CCTV.

2.21 Hydrogen Sulfide Monitoring and Control (HSMC)

CMOM requires evaluating the system to determine the problem with hydrogen sulfide within its system. The program looks at different methodologies to mitigate the effects of H_2S. Authority rates its hydrogen sulfide corrosion vulnerability as minimal and as being only in a few isolated areas. Authority constructed odor control beds at lift stations. Authority is also considering odor control options including the continuation of beds and possibly the addition of Bioxide.

Authority Water's current Hydrogen Sulfide Monitoring business practice score is 4.0. Authority understands the wastewater practices and has implemented a program to meet the proposed CMOM Rule.

Table 2-27 Hydrogen Sulfide Monitoring Business Practice Score

Business Process	Business Practice	Findings	Score
Hydrogen Sulfide Monitoring	Utility has a Hydrogen Sulfide Monitoring Program.	Authority Water has a Hydrogen Sulfide Monitoring Program.	4.0
Odor Problem Documentation	Utility document Hydrogen Sulfide problems.	Authority Water documents odor complaints.	4.0

Additional Assessment Findings
Authority rates its vulnerability to hydrogen sulfide corrosion as a minimal problem. Authority receives very few odor complaints from the public. Authority is developing a standardized approach to handling odor, possibly using a combination of solutions, odor control beds, and chemical treatment.

Section 3
Performance Measures

3.1 Introduction

The availability of information on wastewater collection systems and SSOs is system specific and performance measures are difficult to develop from a national perspective. CDM has reviewed information from the Greater New Haven Water Pollution Control Authority to provide information for tracking its performance. Although national surveys and studies have collected information on the status of collection systems and SSOs, national information on the status of collection systems and the extent of SSO problems remains limited and many municipalities are unaware of the overall extent of SSO problems due to inconsistency in reporting. This issue is complicated by the fact that not all municipalities use the same definition of SSOs. This is one item that will be resolved by the CMOM rule, if and when it is finally promulgated.

This section develops wastewater collection system performance measures that may be used in describing the Authority's wastewater program to both the public and EPA. CMOM looks at a variety of measures, activities, and programs to meet the performance standards in the requirements. Once again, measures, activities, and program requirements need to be tailored to the size, complexity, and specific features of the wastewater collection system.

3.2 Appropriate Performance Measures

System performance measurements should indicate how well or how poorly a wastewater collection system is providing the intended service. The measurement of system performance is crucial to the optimization of maintenance; without proper yardsticks, it is not possible to assess the effectiveness of the maintenance program. All performance measures are not necessarily equal in importance. Therefore, when evaluating an agency's performance, the most important question is how the whole system is performing based on a number of significant factors. It does little good for an agency to have zero pipe failures and yet have a large number of complaints about sewage backing up into homes. Just as with maintenance activities, an effective performance evaluation requires consideration of a number of factors. Table 3-1 shows the Authority's wastewater performance measures and standards used throughout the wastewater industry.

Table 3-1 Authority Wastewater Performance Measures

Measure	Total Miles of Pipe	Main Lines Repaired No./ Miles of Pipe	SSOs No./ Miles of Pipe	Sewer Lines Cleaned/ Miles of Pipe	Televised Lines/ Miles of Pipe
2007	556	0.	0.12	12.8	

Table 3-2 provides detailed information on Authority's reported SSO events for Calendar Year (CY 2007).

Table 3-2 Reportable Sanitary Sewer Overflows CY 2007

Month	Grease (ea)	Rags (ea)	Debris (ea)	Broken Main (ea)	Pump Station Failure (ea)	Roots (ea)	Lateral (ea)	Wet Weather (ea)	Total SSOs (ea)	Total Gallons (SSOs)
January	3	0	0	0	0	2	0	0	5	275
February	3	0	0	0	0	0	0	0	3	55
March	3	0	1	0	0	1	0	5	10	275
April	2	0	0	0	0	0	0	18	20	24,497
May	2	0	0	0	0	0	0	0	2	200
June	1	0	1	0	0	1	0	1	4	125
July	3	0	0	0	0	0	1	0	4	265
August	2	0	1	0	0	1	0	0	4	121
September	3	0	0	0	0	0	1	0	4	716
October	2	0	1	0	1	0	0	0	4	270
November	2	1	1	0	0	0	1	0	5	1,793
December	2	0	0	0	0	0	0	0	2	2,561
Total	28	0	5	0	1	5	3	24	66	31,153

In terms of SSOs, the Authority has experienced overflows in its system and continues to reduce the number through an aggressive cleaning program. This program as described in previous sections has identified problem areas and increases the frequency of cleaning in these areas. The total gallons spilled were measured by personnel and the reasons for each reportable spill is detailed on the Authority's Sanitary Overflow Report and used in future years for analysis.

Section 4
Action Plan

The following is a summary of individual business practices that have been identified with specific actions to improve on the Authority's CMOM score of the Authority. The suggested actions provide recommendations to bring the business practice score to the higher value.

Table 4-1 Action Plan

Business Practices	Score	Suggested Actions
ED: Construction Inspection	3.5	Develop written Construction Inspection procedures to be followed by Authority Inspectors.
ED: Condition Assessment	3.0	Develop an asset management program that includes a prioritization program with asset criticality. This asset management strategy should go beyond the typical CIP planning horizon of five years. Implement a wastewater collection system inspection program using CCTV interaction with power cleaning. Data should be documented in an accessible and useable format. Develop and document condition assessment data on force mains. Note: OMI effort will meet the immediate condition assessment needs of the Authority. The recommendations in this action plan goes beyond the CIP planning horizon of five years.
SAF: General Safety Procedures	4.0	Authority should consider looking at a program that will includes its staff (Engineering Inspectors).
CS: Service Responsiveness / Policy	2.0	Develop customer service policy document with written procedures including how to address customers regarding: complaints, private "problems," and not public, damage to private property, This is a document that will describe the Authority's response to problems, and potential impacts from sewer back-ups (health). Implementation of the new CIS – Review the use of telephone technology and evaluate customer wait time, prioritize calls, electronic management of work, offer customers a streamline menu of information and choices including how a customer can opt out of a telephone queue, and provide location information about caller. Implementation of the new CIS - Accurate, timely information on the customer, which is located in the Customer Information System. Standard procedures written on how the Customer Information Systems are operated by the user. Customer Service Policy Assessment –Understand that the Utility's policies should be developed to improve service being delivered and protect the interests of the rate payers. Evaluate each current policy (if any) once defined and eliminate any that do not improve the service or protect the interest of the customer. Training – Define the training program on both the human and business side of the customer business. Review and align customer service policy that addresses typical

Table 4-1 Action Plan

Business Practices	Score	Suggested Actions
		environmental concerns of the customer. Develop a goal and record the response time to respond to a customer complaint.
ESM: Equipment Purchase and Repair	3.0	Evaluate the size and the requirements of existing equipment to handle the current and future work load. Identify current ratio of down time to operational time on equipment. Work to maximize the time equipment is available to operate in cleaning and inspecting the collection system. Identify the time equipment is being used in the field. Develop a training schedule and plan when new equipment is purchased either through the vendor or internally by Authority / OMI Staff.
ESM: Tools Purchase and Inventory	3.0	Evaluate the tools to handle the current and future work load. Additional tools may be needed in the future for the delivery of service. Track the location of the tools. Develop a standard inventory listing of tools and equipment for vehicles that have small tools (Standard Operating Load).
EPI: Spare Parts Purchase and Inventory	2.5	Implement the computerized inventory system with access through the work management system. Implement the Spare Parts Inventory Management Program to include: ▪ Critical Spare Parts Identified ▪ Critical Spare Parts Access Control ▪ Computerized Spare Parts Inventory ▪ Inventory of standard load carried on vehicles
EPI: Supplies Purchase and Inventory	2.5	Updated written criteria for the purchase of supplies. Put a program in place to facilitate purchasing supplies, which includes the criteria used for purchase.
TVI: Condition Assessment CCTV	2.0	Implement inspection program to review the quality of cleaning being performed in the system. Authority should evaluate and set annual target for televising its collection system. OMI has submitted a proposal that will lamp the system and develops recommendations for repair and rehabilitation of its collection system.
CLN: Residential Easement and Right-of-Way	2.0	Implement a management program for rights-of-way and easements including: ▪ cleaning schedule ▪ recording the number of stream crossings ▪ determining the number of crews/personnel needed for maintenance ▪ scheduling maintenance activities ▪ Written standard operating procedure

Table 4-1 Action Plan

Business Practices	Score	Suggested Actions
		▪ Developed performance measures Develop written SOPs for individual tasks and procedures. These SOPs should used for training and improving the overall work process. These SOPs should be a Authority document used by the contract operator.
CLN: FOG Program Public Education	4.0	Increase education efforts with focus on apartment and condominiums (high density housing). Make multi-lingual information available to the public.
MAN: Inspection	4.0	Manhole inspection program that includes top to bottom survey of the manhole including frame and cover as well as complete documentation of its condition. This data should be documented in an easily accessible and useable format.
OERP: Planning Steps and Tasks	4	Develop a written OERP plan that will be used by Authority staff. This plan should incorporate the actions / procedures required by Authority staff in the event of a major overflow. This document is separate to OMI's emergency planning documents.
HSMC: Hydrogen Sulfide Monitoring	4	Provide H2S monitors at all pump stations and provide hand-held monitors to OMI staff for use prior to maintenance activities. Record H2S levels in data base including location, flow, and concentration. Develop additional corrosion control measures that are not limited to H2S and should include data on flows with varying pH. This data should be documented and accessible in a useable format.
HSMC: Odor Problem Documentation	4	Document and map odor complaints and dispatch a field crew to record odor levels quickly following odor complaints. Record weather and wind conditions with each complaint. Map the odor complaints and develop an odor model to help track and determine odor patterns.